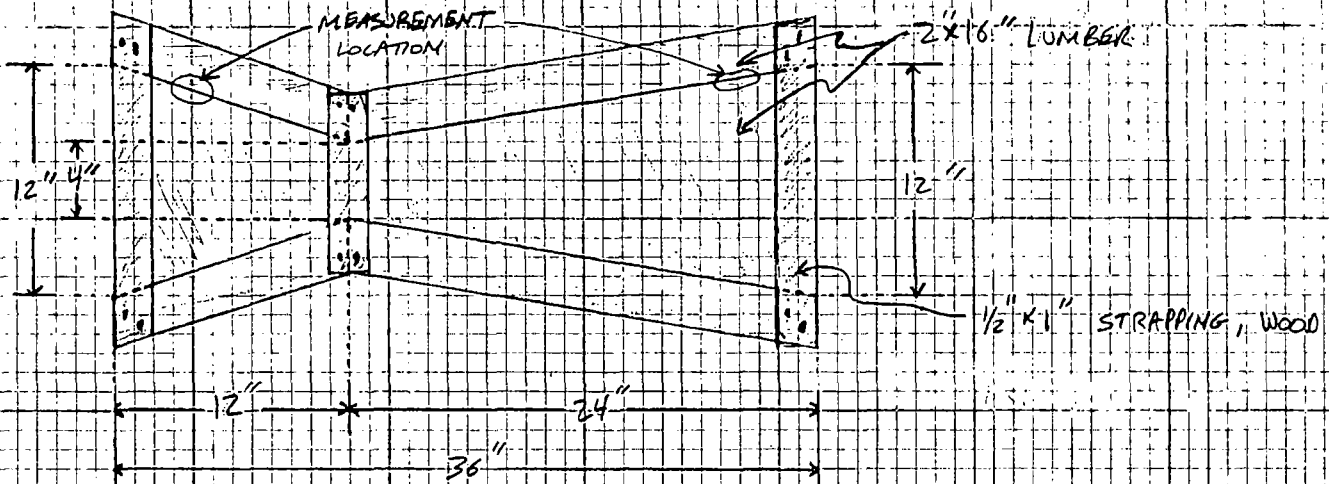


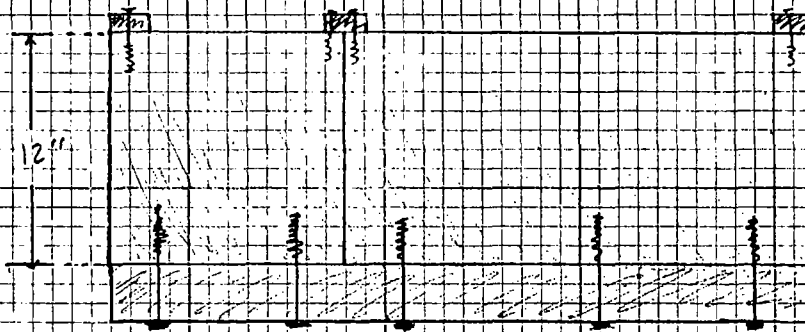
4x36 CULVERT FLUME

PROJECT NO. 148562.05.02 6.9.3

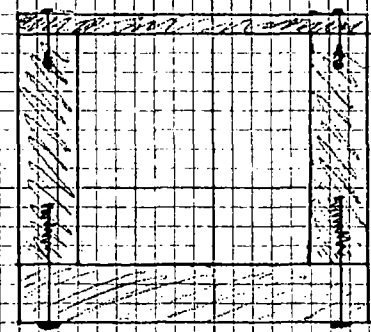
PLAN VIEW



SIDE VIEW



FRONT VIEW



SPECIFICATIONS:

- USE ONLY STAINLESS STEEL WOOD SCREWS, GLUE ALL JOINTS W/ EPOXY GLUE
- SMOOTH INTERIOR SURFACE, CAULK INTERIOR JOINTS, MAKE SURE
- MEASUREMENT LOCATIONS ARE CLEAR 90° ANGLES FOR ACCURACY
- PAINT ENTIRE FLUME W/ EPOXY PAINT,

114240

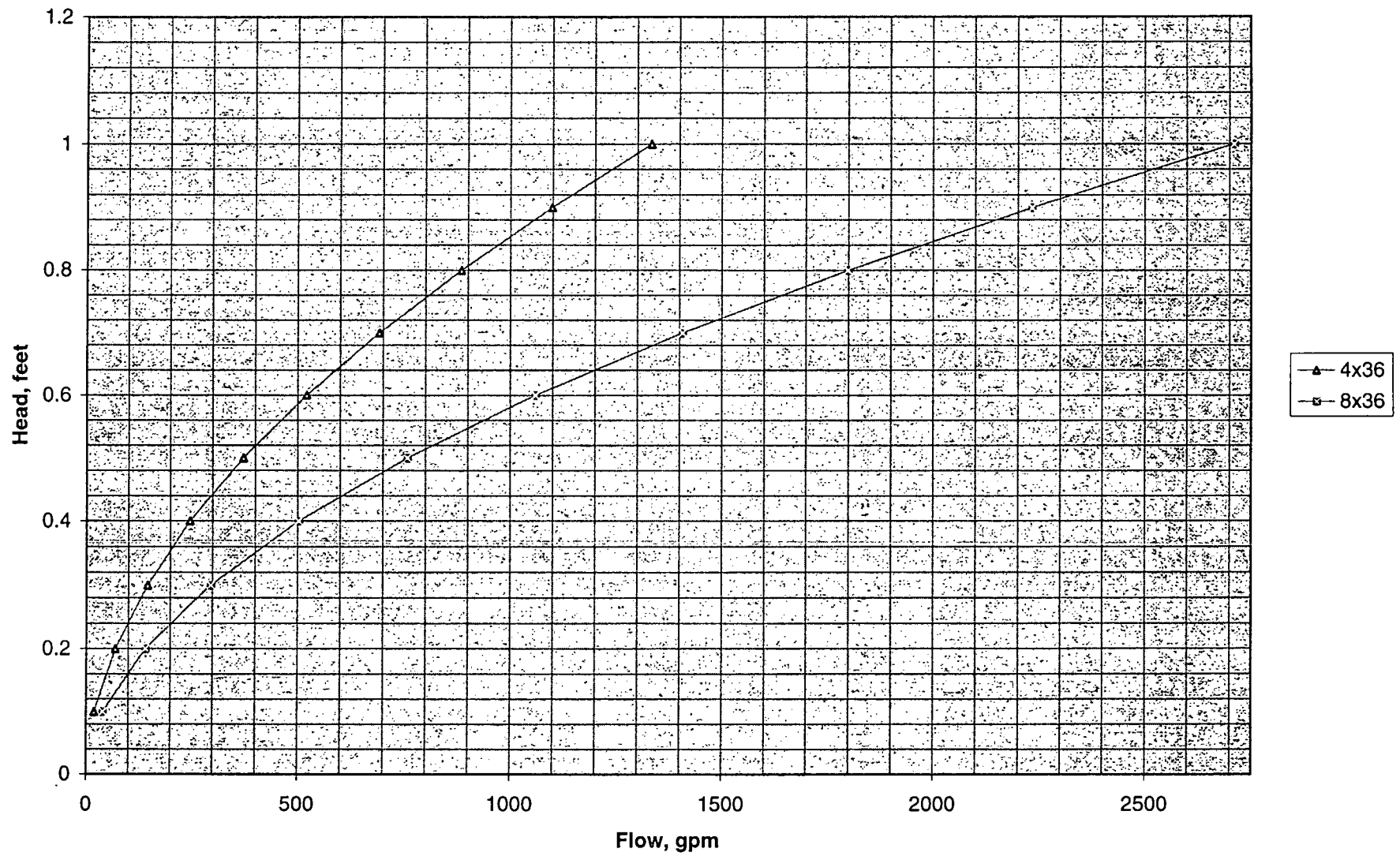
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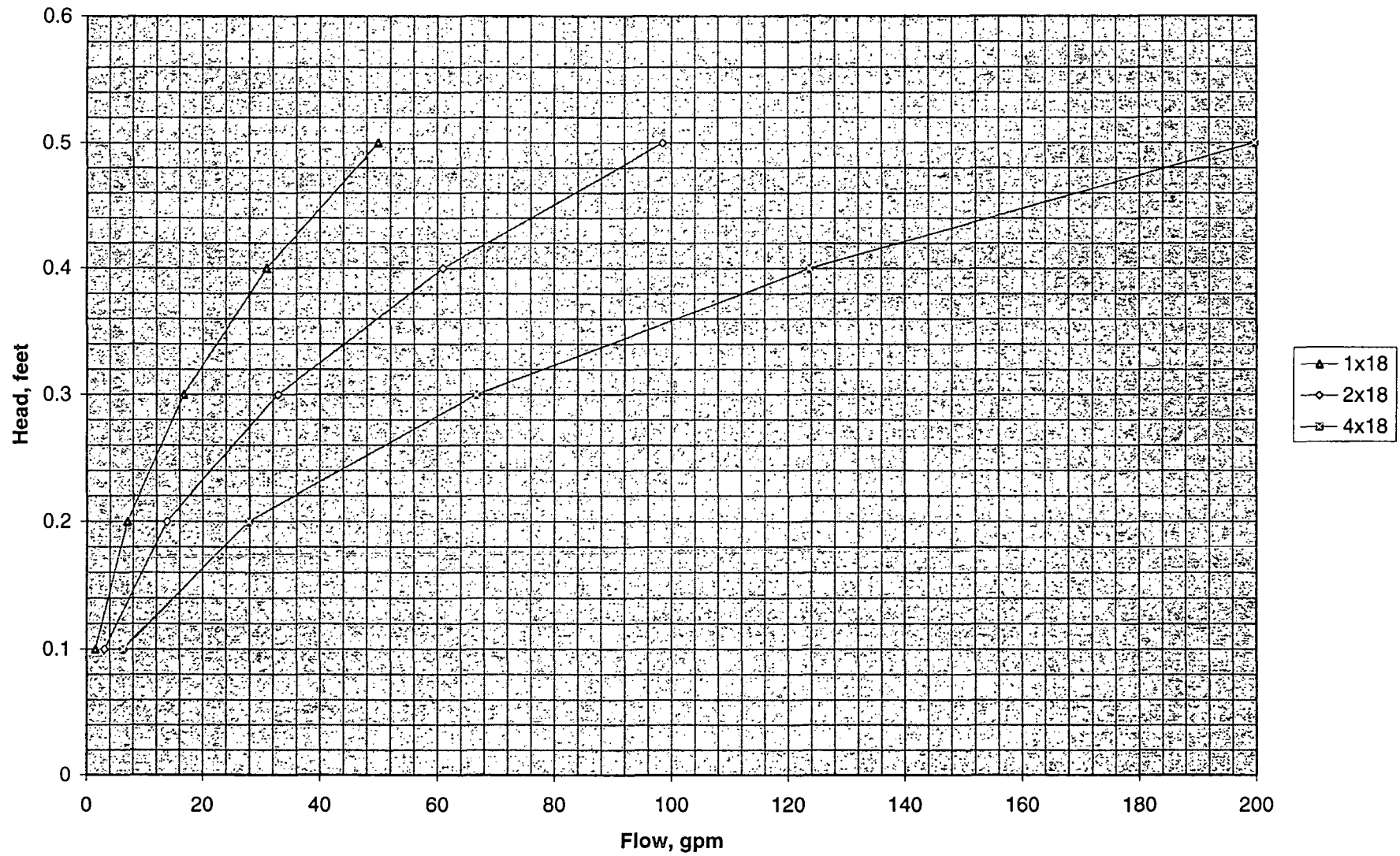
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Proposed Flow Measuring Locations Bunker Hill Mine Water Management							
Location	Rationale	Maximum Measured Flows (Erikson, cfs) ¹	Maximum Measured Flows (Erikson, gpm) ¹	Measured Flow Dates (Erikson)	Maximum Measured Flows (Riley, gpm) ²	Proposed Design Flows (gpm) ³	Design Remarks ⁴
Phase I Locations							
3 Level							
Utz Drift	Assess effectiveness of Milo Creek diversions						
Homestake Drift	Assess effectiveness of Milo Creek diversions						
5 Level							
Becker	Measure tributary flows from ore chutes. Discharges to the Loadout Area @ 9 Level.	0.29	130	2/83 to 9/84	113	228	4 x 36 cutthroat
Williams	Russell Tunnel, and various ore chutes and raises downstream from the New East Reed Flume. Discharge is tributary to the Loadout Area @ 9 Level.	0.42	188	2/83 to 9/84	192	336	4x36 cutthroat, cleaned out and operating
West Reed	Flow originates from ore chutes, caved and flooded drifts west to the Cherry Raise area. Flow is normally tributary to the Becker Weir, occasionally tributary to the Reed Tunnel due to build-up downstream of the West Reed Flume.	0.046	21	2/84 to 9/84	29	51	trapezoidal flume was used. 2x18 proposed
9 Level							
Loadout Area @ 9 Level	Tributary to Kellogg Tunnel flume.	1.2	539	2/83 to 9/84	620	1085	12" trapezoidal weir used previously, 4x36 cutthroat proposed
Stanley Ore Chute	Drains a portion of the Guy Caving operation. Flow is tributary to the Loadout Area @ 9 Level.	0.025	11	2/83 to 9/84	11	20	bucket & stopwatch, has a lot of debris and floods up driftwalls
Van Raise or Cherry Raise	Measures flow coming down the Cherry Raise from below the 5 Level. Tributary to the Loadout Area @ 9 Level.	0.067	30	12/83 to 9/84	33	58	30 degree v-notch weir used previously, 2x18 cutthroat proposed
No. 2 (White) Raise Pumps	Will be measured at the Kellogg Tunnel by taking the difference between flow while pumps are on versus flow while pumps are off.	NA	NA	NA	Approx. 550	NA	NA
Kellogg Tunnel	Measures all discharge from the Bunker Hill Mine.	5.4	2424	1/83 to 8/84	2428	4249	existing 12" parshall flume
Barney Switch	Measures drainage from the west end of the mine including areas around the No. 3, Orr, and Skookum Shafts. Tributary to Kellogg Tunnel Flume	0.85	381	12/83 to 9/84	253	668	4x36 cutthroat flume
Phase II Locations							
5 Level							
New East Reed Flume	Measure discharge from exploration drill holes, rock bolt holes, and fractures in the New East Reed Drift. The drainage area is isolated from overlying and underlying mine development. Flow is tributary to Williams Weir. The need for this flume will be based on comparison of historic and current flows at Williams Weir.	0.11	49	1/84 to 9/84	69	121	4x18 cutthroat flume
Russel Dam Weir	Flow to this weir is controlled by low dam blocking the Old East Reed Drift. Discharge originates from drill holes and fractures in the Old East Reed Drift and from an ore chute in the Governor Cross-cut. Flow is tributary to the Williams Weir. The need for this flume will be based on comparison of historic and current flows at Williams Weir.	0.12	54	12/83 to 9/84	53	94	30 degree v-notch weir used previously, 2x18 cutthroat proposed
10 Level							
Deadwood Side, or Jersey	The need for this flume will be based on concentration and flow data obtained from No. 2 pump. Approximately 20 - 30 gpm coming from 10 level.						
Note: 1 - Based on maximum flows presented in <i>Analysis of Water Movement in An Underground Lead-Zinc Mine, Coeur d'Alene Mining District, Idaho</i> . D.L. Erikson, 1985. 2 - Based on maximum flows measured by Riley between 1/83 and 12/85. 3 - Based on the higher of Riley or Erikson maximum flows times 1.75 factor of safety. 4 - Flumes that required installation are in bold.							

Flow vs. Head for 4x36 and 8x36 Cutthroat Flumes



Flow vs. Head for 1x18, 2x18, and 4x18 Cutthroat Flumes



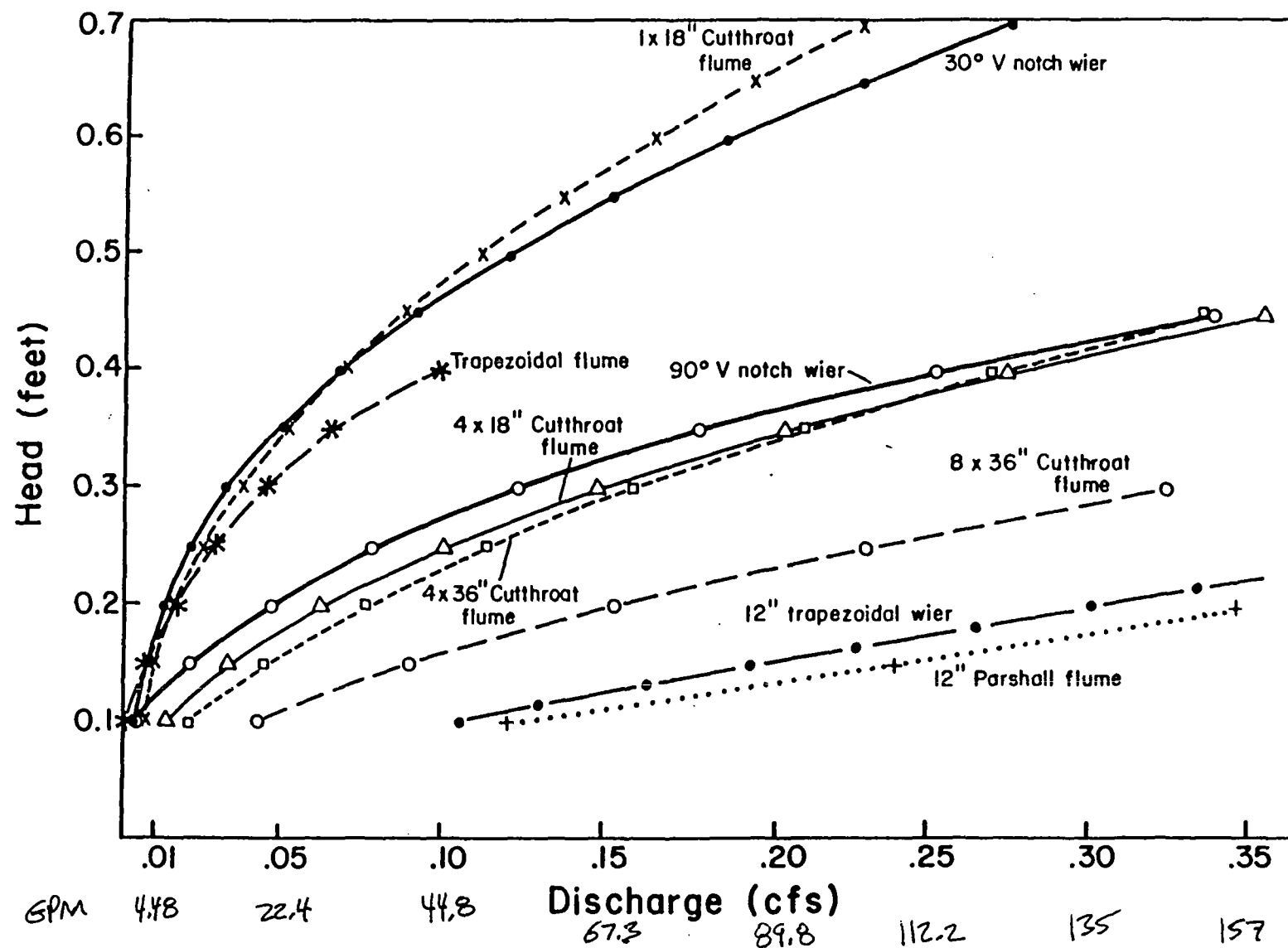


Figure A1. Head-discharge relationships for various flumes and weirs.